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Reasons for Decision

Interprovincial Pipe Line Inc.

OH-1-98



June 1998

Facilities and Toll Methodology

National Energy Board

Reasons for Decision

In the Matter of

Interprovincial Pipe Line Inc.

Application dated 2 December 1997,
as amended, for the Terrace Phase I
Expansion Program

OH-1-98

June 1998

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represented by the National Energy Board

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Abbreviations and Definitions

Act	<i>National Energy Board Act</i>
apportionment	The method of allocating the difference between the total nominated volume and the available pipeline operating capacity, where the latter is smaller.
barrel	One barrel is approximately equal to 0.16 m ³ .
b/d	barrels per day
Board	National Energy Board
CAPP	Canadian Association of Petroleum Producers
CEAA	<i>Canadian Environmental Assessment Act</i>
crude oil and equivalent	A collective term used to refer to all grades of crude oil, including conventional light and heavy crude oil, pentanes and heavier hydrocarbons, synthetic crude oil and bitumen.
Express	Express Pipeline Ltd.
Guidelines for Negotiated Settlements	The Board's 1994 <i>Guidelines for Negotiated Settlements of Traffic, Tolls and Tariffs</i>
heavy crude oil	A collective term which includes conventional heavy crude oil and bitumen.
IPL	Interprovincial Pipe Line Inc.
km	kilometre
KP	kilometre post
Lakehead	Lakehead Pipe Line Partners, L.P.
laminar flow	A flow regime where fluid molecules in a pipe move in a parallel manner and the fluid exhibits a parabolic velocity profile (i.e., velocity at the pipe wall is zero while velocity at the centre of the pipe is the maximum).
Line 9	IPL's pipeline that extends from Sarnia, Ontario to Montreal, Quebec.

Line 14	A pipeline currently under construction by Lakehead which will extend from Superior, Wisconsin to the Chicago, Illinois area.
m^3/d	cubic metres per day
mm	millimetre
netback	The per unit price received by a producer from the sale of crude oil, less applicable costs. These typically include transportation and marketing fees.
OD	outside diameter
OH-1-96	Interprovincial Pipe Line Inc., Application for System Expansion Program Phase II, Reasons for Decision dated July 1996.
OH-2-97	Interprovincial Pipe Line Inc., Application for the Line 9 Reversal Project, Reasons for Decision dated December 1997.
OSE	A light sour synthetic crude oil that is produced at the Suncor Inc. oil sands plant in Fort McMurray, Alberta.
PADD	U.S. Petroleum Administration for Defence Districts
SEP II	Interprovincial Pipe Line Inc.'s System Expansion Program Phase II, approved by the Board in OH-1-96.
Terrace Phase I	Interprovincial Pipe Line Inc.'s Terrace Phase I Expansion Program.
WTI	West Texas Intermediate crude oil - a light sweet crude oil, produced in the United States, which is the benchmark grade of crude oil for North American price quotations.

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the regulations made thereunder;

IN THE MATTER OF an application by Interprovincial Pipe Line Inc. dated 2 December 1997, as amended on 31 March 1998, for a Certificate of Public Convenience and Necessity pursuant to section 52 of the Act; an order pursuant to section 58 of the Act for other related facilities; an order pursuant to section 21 of the Act varying Board Order XO-J1-10-98; and an order under Part IV of the Act respecting toll design methodology; and

IN THE MATTER OF the National Energy Board Hearing Order OH-1-98.

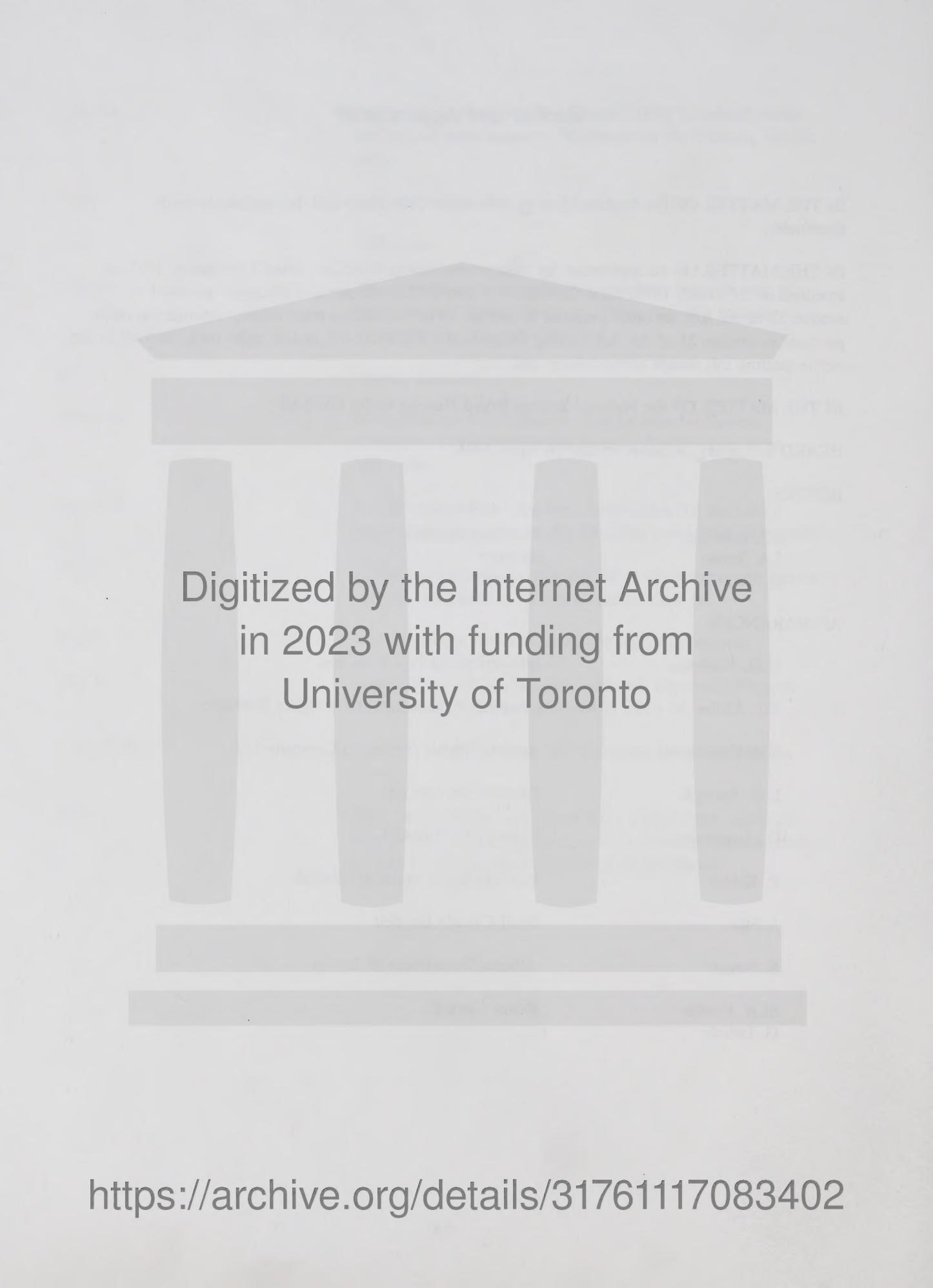
HEARD at Calgary, Alberta, 15 and 16 April 1998.

BEFORE:

R.J. Harrison	Presiding Member
J.A. Snider	Member
D. Valiela	Member

APPEARANCES:

G.M. Nettleton	Interprovincial Pipe Line Inc.
K.F. Miller	Canadian Association of Petroleum Producers
S.H. Castonguay	Amoco Canada Petroleum Company Ltd.
L.G. Keough	Express Pipeline Ltd.
D. Armstrong	Imperial Oil Limited
P. Kahler	PanCanadian Petroleum Limited
J. Ellis	Shell Canada Limited
B. Netzel	Alberta Department of Energy
M.A. Fowke	Board Counsel
G. Delisle	



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Chapter 1

Introduction

1.1 The Application

By letter dated 2 December 1997 and as amended on 31 March 1998, Interprovincial Pipe Line Inc. ("IPL") applied to the National Energy Board ("Board"):

- (a) pursuant to section 52 of the *National Energy Board Act*¹ ("Act"), for a Certificate of Public Convenience and Necessity for new line pipe facilities;
- (b) pursuant to section 58 of the Act, for an order exempting all applied-for pump unit additions, replacements and modifications and related station facilities and piping from the provisions of sections 30, 31 and 47 of the Act;
- (c) pursuant to section 21 of the Act, for an amending order varying Board Order XO-J1-10-98 to allow for the relocation of certain scraper trap facilities; and
- (d) pursuant to Part IV of the Act, for an order approving a toll design methodology.

IPL's Terrace Phase I Expansion Program ("Terrace Phase I") involves the construction of 15 new sections of 914 millimetre ("mm") (36 inch) outside diameter ("OD") pipeline to connect to existing 1219 mm (48 inch) OD pipe sections to create a fifth pipeline ("Line 4") between Kerrobert, Saskatchewan and the international border near IPL's Gretna pump station in Manitoba. The applied-for facilities include 619 kilometres ("km") (385 miles) of pipeline, 19 pumping unit additions, 15 tie-in facilities and related station facility equipment. Approximately 373 km (232 miles) of pipeline would be constructed within existing IPL easements, while 246 km (153 miles) would be constructed on new easements to be acquired adjacent to existing IPL easements.

The estimated capital cost of the Terrace Phase I facilities is \$610 million. The new line pipe is expected to be in service by 31 January 1999, while all pumping facilities are expected to be in service by 1 September 1999. The applied-for facilities would increase the throughput capability of the existing IPL system by approximately 27 000 cubic metres per day ("m³/d") (170,000 barrels per day ("b/d")).

IPL noted in its original filing that, at the request of the Canadian Association of Petroleum Producers ("CAPP"), it would be entering into discussions concerning the potential implementation of alternate tolling methodologies for Terrace Phase I. In the interim, IPL requested that Terrace Phase I be tolled on a rolled-in basis and treated as a Non-Routine Adjustment within the meaning of paragraph 7.1(a)(i) of the Principles of Settlement filed in support of IPL's 1995 Incentive Toll Application, which was approved by the Board pursuant to Order TO-1-95.

¹ R.S.C. 1985, c. N-7.

On 15 April 1998, IPL filed with the Board a tolling agreement (dated 14 April 1998) that it had negotiated with CAPP. IPL submitted that the tolling agreement would result in just and reasonable tolls and that its terms should be approved by the Board pursuant to Part IV of the Act and in accordance with the Board's 1994 *Guidelines for Negotiated Settlements of Traffic, Tolls and Tariffs* ("Guidelines for Negotiated Settlements"). By letter dated 15 April 1998, the Board sought comments on the agreement from parties to the hearing and shippers on the IPL system. No comments were received by the Board. A copy of the agreement is attached as Appendix II¹.

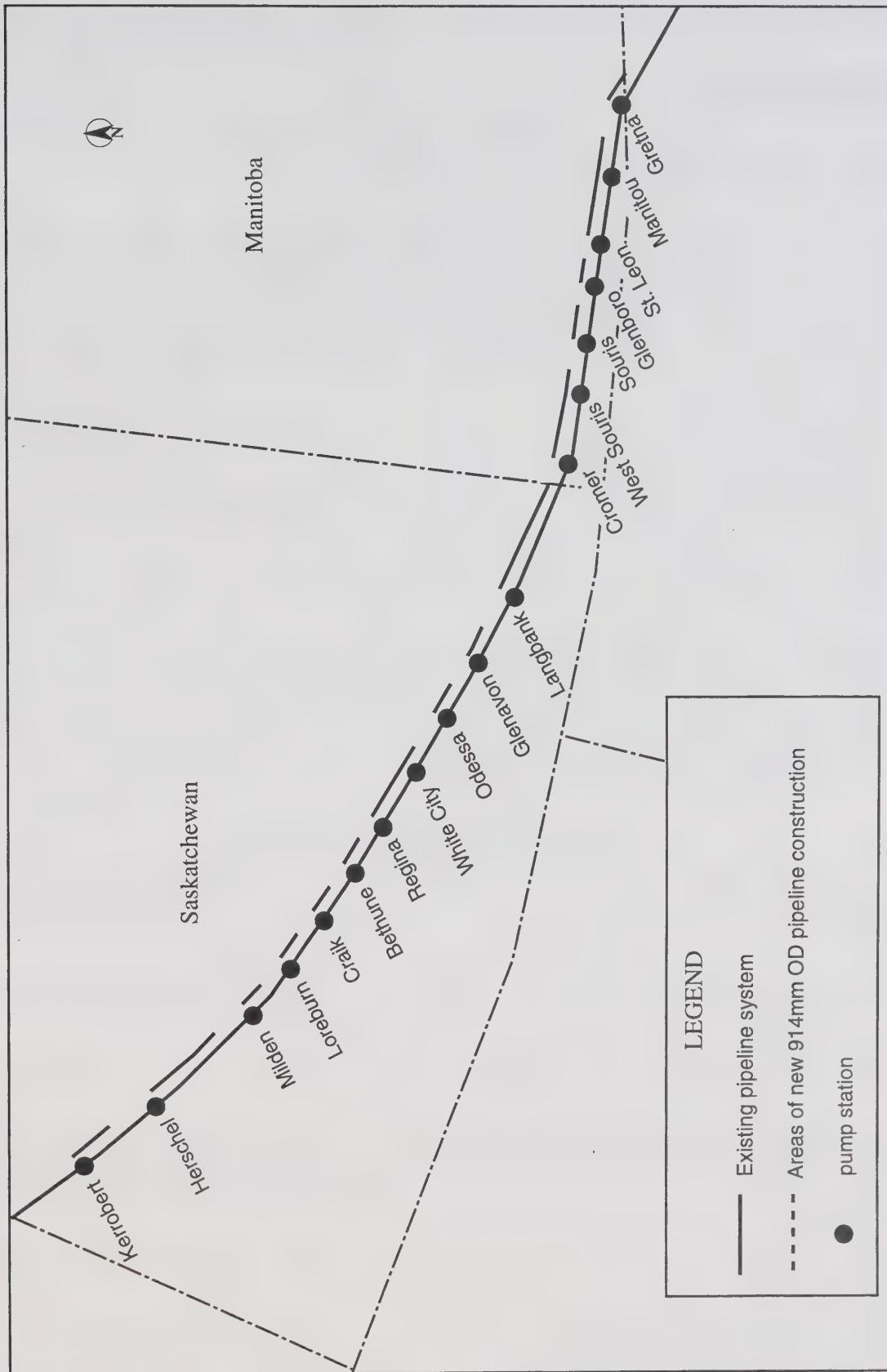
1.2 Environmental Screening

The Board conducted an environmental screening of the applied-for facilities in compliance with the *Canadian Environmental Assessment Act* ("CEAA"). The Board ensured that there was no duplication in the requirements under its regulatory process and the CEEA.

The Board determined that, taking into account the implementation of IPL's proposed mitigative measures and those set out in the attached conditions, the project is not likely to cause significant adverse environmental effects. This represents a decision pursuant to paragraph 20(1)(a) of the CEAA.

¹ Please note that the text of the agreement as shown in Appendix II has been incorporated electronically into these Reasons from a file provided by IPL and, therefore, the Board cannot be certain that there are no discrepancies between this text and the actual text of the agreement. If any discrepancies exist, the Board directs readers to refer to the original document which constitutes the official version.

Figure 1-1
Interprovincial Pipe Line Inc.
Terrace Phase I Expansion



Chapter 2

Facilities

2.1 Current and Proposed Operation

The current and proposed operation of the IPL system is illustrated graphically in Appendix III and is briefly summarized below. Currently, much of the IPL system between Edmonton, Alberta and Gretna operates in a "looped" manner, where the product flow crosses over to a larger diameter pipeline upstream of each pump station, thereby increasing the capacity of each line. At the discharge side of each pump station, the product flows back into the "original" diameter pipe for that line.

Under Terrace Phase I, the present looped configuration would be replaced by straight-through operation for Lines 2, 13 and part of Line 3. This "de-looping" would result in capacity reductions on these lines. The proposed straight-through operation would allow the existing 1219 mm (48 inch) OD pipe sections currently used by Line 3 to be combined with the applied-for construction of 15 sections of 914 mm (36 inch) OD pipe to form the new Line 4. This would result in Lines 3 and 4 being operated in a partially looped manner between Edmonton and Kerrobert and in a straight-through manner downstream of Kerrobert. Line 2 would originate at the Kerrobert station.

In addition, IPL proposed that the commodities be switched between Lines 2 and 3. Line 2 would operate in heavy crude service (in laminar flow), which would have the effect of further reducing capacity on this line. Line 3 would operate in light and medium service. The proposed Line 4 would operate in heavy crude oil service. Table 2-1 lists the current and proposed post Terrace Phase I commodities that would be transported in each line.

Table 2-1
Allocation of Commodity Types by Line

<u>Line</u>	<u>Without Terrace Phase I</u>	<u>With Terrace Phase I</u>
1	Natural gas liquids, Synthetics, Lube light, Light sweet.	Natural gas liquids, Synthetics, Lube light, Light sweet.
2	Light sweet, Light sour, Condensate, OSE, Midale, Sarnia Special, Light sour blend.	Heavy.
3	Heavy, Bow River, Light sweet, Light sour.	Light sweet, Light sour, Condensate, Midale, Light synthetics, Sarnia Special, Light sour blend.
4	Not applicable.	Heavy, Bow River, Light sour, Midale, Heavy synthetics.
13	Refined products, Synthetics.	Refined products, Synthetics.

The combination of de-looping, creation of Line 4 and switching of commodities would result in system capacity changes as shown in Table 2-2.

Table 2-2
Annual Throughput Capacities
($10^3 \text{m}^3/\text{d}$)

Line	Current	Post-Terrace		Change
		Phase I		
1	49.5	49.5		0
13	31.0	27.8		(3.2)
2	79.5	25.0		(54.5)
3	99.1	81.2		(17.9)
4	0	102.1		102.1
Total	259.1	285.6		26.5

2.2 Applied-for Facilities

A summary of the facility additions and modifications by line number is provided below:

- Line 1 - no changes;
- Line 2 - pump and motor additions at two stations with associated building additions, pump and motor relocations at five stations, and delivery and injection piping modifications at two stations;
- Line 3 - piping modifications at six Line 2 stations, and delivery and injection piping modifications at three stations;
- Line 4 - construction of approximately 619 km of 914 mm OD pipe sections with associated sectionalizing valves, 15 tie-in facilities, pump unit additions at three stations (three new pumps at each station) and required building additions, piping and unit modifications at 15 stations, pump and motor replacements at four stations, and delivery and injection piping modifications at two stations.

With respect to the station facilities, IPL applied pursuant to section 58 of the Act for an order exempting all applied-for pump unit additions, replacements and modifications and related facilities and station piping (as detailed in Schedule A of Appendix V) from the requirements of sections 30, 31 and 47 of the Act.

IPL also applied for an amending order pursuant to section 21 of the Act for the relocation of previously approved¹ 1219 mm OD scraper trap facilities. IPL now intends to use these facilities as part of the Terrace Phase I program. Three receiving scraper traps will be installed as originally proposed at the Herschel, Glenboro and Glenavon stations and the remaining three sending scraper traps would be installed at the Loreburn, Craik and Odessa stations. In addition, seven existing 1219 mm OD sending traps would be dismantled and stored for future use, with the exception of one sending unit which would be relocated and used at the Souris station.

The operation of Lines 2, 13 and part of Line 3 in a straight-through manner would result in currently used crossover piping being taken out of service. IPL stated during the hearing that it intends to remove essentially all of the crossover piping and confirmed that it would file an application with the Board for the piping removal.

With respect to river crossings, IPL submitted that it is evaluating the feasibility of directionally drilling the South Saskatchewan, Qu'Appelle and Souris Rivers before making a final determination of the type of crossing methodology to be used at each of these locations. IPL stated that it would consider geotechnical feasibility, constructability, environmental concerns and cost constraints in order to determine the preferred crossing methodology for each of these rivers.

IPL submitted that the design and construction of Terrace Phase I would be in accordance with the Board's *Onshore Pipeline Regulations*² and would meet or exceed the requirements of the 1996 edition of the Canadian Standards Association standard Z662, *Oil and Gas Pipeline Systems*. IPL also indicated that the capital cost of the Terrace Phase I facilities, estimated to be \$610 million, is based on a combination of estimated and actual material quotations and historical construction costs.

Views of the Board

While the Board would be concerned about the ongoing integrity of the unused crossover piping once IPL's system is de-looped, the Board understands that IPL will apply for the removal of this piping within a reasonable time frame. If IPL chooses not to remove these crossovers, it is reminded that, pursuant to subsection 53(1) of the *Onshore Pipeline Regulations*, an application will be required for the deactivation of the crossover piping if IPL proposes to deactivate the piping for 12 months or more.

In the Board's view, directionally drilling the South Saskatchewan, Qu'Appelle and Souris Rivers would be the preferred crossing method from an environmental perspective. While the Board recognizes the constraints associated with this crossing methodology, such as geotechnical concerns and cost, it is not prepared to provide blanket approval for IPL's proposed alternative crossing methodologies in the absence of information on the technical feasibility of directional drilling. Therefore, the Board will require IPL to file a report on the feasibility of directionally drilling these rivers and obtain approval of the Board for the crossing methodology of each river prior to construction at each location.

¹ Board Order XO-J1-10-98.

² SOR 89-303.

The Board is satisfied that the proposed Terrace Phase I facilities are appropriate for the purposes of the proposed service and that all design and construction activities will meet the applicable standards and regulatory requirements. As well, the Board considers the costs associated with the facilities to be reasonable.

2.3 Integrity

2.3.1 Line 4 - Internal Inspection Capability

To ensure that Line 4 would be 100 percent capable of internal inspection, IPL had originally intended to use separate internal inspection tools for the proposed 914 mm OD and existing 1219 mm OD pipe sections. To facilitate this, IPL applied for the installation of scraper trap facilities at each location where connections between the two pipeline diameters would occur. Subsequently, IPL determined that advances in internal inspection tool technology would allow the development of one tool to inspect line pipe of different diameters and, therefore, modified its application to make use of previously approved scraper trap facilities as described in Section 2.2.

2.3.2 Line 13 - Idle Pipe Sections

During the hearing, the Board questioned IPL regarding the current status of the 406 mm (16 inch) OD mainline on Line 13 and the 610 mm (24 inch) OD loop sections on Line 2 between Regina, Saskatchewan and Gretna. IPL submitted that, from late 1994 to May 1997, Line 13 had operated in a parallel flow configuration using both the 406 mm OD mainline and the 610 mm OD loops. In May 1997, Line 13 was placed in a looped operation which resulted in the 406 mm OD pipe sections becoming idle. Between May 1997 and the present, the idle sections have been filled with light crude oil and have been utilized to facilitate loop swings associated with the internal inspection of adjacent pipelines. IPL submitted that, once the Terrace Phase I facilities are in service, Line 13 would be in straight-through operation using the 406 mm OD mainline and the 610 mm OD loops would be used by Line 2 in straight-through operation. IPL also indicated that a high-resolution internal inspection of Line 13 was conducted in 1995. Based on this inspection, Line 13 was subsequently examined and repaired, and a follow-up internal inspection is scheduled for 2001. Additionally, Line 13 was hydrostatically tested between Regina and Cromer, Manitoba in 1993 and between Cromer and Gretna in 1994.

2.3.3 Line 2 - Laminar Flow

IPL indicated that it intends to operate Line 2 in laminar flow and that it is aware of the potential for increased internal corrosion associated with this slower flow rate. IPL submitted that it intends to increase its internal inspection frequency and to utilize inhibitors to control internal corrosion.

Views of the Board

The Board understands that an internal inspection tool capable of inspecting dual diameter pipelines of the sizes required by IPL (914 mm/1219 mm OD) does not currently exist. However, given that IPL is presently working to develop a tool for the required pipe sizes and may not need to internally inspect Line 4 for several years, the Board is reasonably confident that the required inspection equipment will be available when required.

As a result of IPL's ongoing integrity management program, including periodic in-line inspection and hydrostatic testing, the Board is of the view that IPL has adequately addressed the potential integrity issues associated with the idle 406 mm OD pipe sections on Line 13.

IPL agreed with the Board's understanding that the proposed laminar flow operation of Line 2 could increase the possibility of internal corrosion. However, the Board is of the view that the information IPL has provided to date with respect to internal corrosion mitigation on Line 2 is incomplete. Therefore, IPL is directed to re-evaluate its existing Line 2 internal corrosion control program, addressing potential corrosion issues associated with laminar flow, and to file the results with the Board.

2.4 Alternatives to the Proposed Expansion

As part of its application, IPL provided an evaluation of eight alternatives for the Terrace Phase I design, as outlined in Table 2-3.

Table 2-3
Alternatives to the Proposed Expansion

<u>Alternative</u>	<u>Canadian Pipeline Facilities Required</u>		<u>Configuration</u>
<u>No.</u>	<u>Description</u>		
1	Do nothing	None	N/A
2	914 mm OD / 1219 mm OD Phased	744 km of 914 mm OD pipe (619 km - Phase I)	Line 3 and new 914 mm OD/1219 mm OD would provide light/medium and heavy capacity
3	660 mm OD Phased	1066 km of 660 mm OD pipe	Line 3 and the new 660 mm OD would provide heavy crude capacity
4	762 mm OD/ 1219 mm OD	740 km of 762 mm OD pipe	Line 3 and new 762 mm OD/1219 mm OD would provide light/medium and heavy capacity
5	610 mm OD Single Phase	1066 km of 406.4 mm OD pipe	Line 3 and the new 610 mm OD would provide heavy crude capacity
6	Extend 1219 mm OD Loops on Line 3	743 km of 1219 mm OD pipe	No change
7	Two 508 mm OD Lines	2138 km of 508 mm OD pipe	Line 3 and the two new 508 mm OD lines would provide medium and heavy capacity
8	1067 mm OD/1219 mm OD	744 km of 1219 mm OD pipe	Line 3 and new 1067 mm OD/1219 mm OD line would provide light/medium and heavy capacity

IPL consulted with industry representatives and conducted quantitative and qualitative comparisons of these alternatives in order to determine the best design solution. IPL considered the following criteria in its assessment:

- ability to meet long-term and short-term capacity demands;
- expansion capability and system flexibility;
- system reliability;
- system operability; and
- economics including the present value of capital costs, operating costs and operating savings to both IPL and industry.

IPL selected Alternative No. 2 (914 mm OD/1219 mm OD) because it would meet the short-, medium- and long-term needs of IPL's operation, it represents a flexible and reliable design, and it would result in the lowest overall cost to the industry.

Views of the Board

The Board finds a comparison of viable alternatives relevant to its assessment of the appropriateness of a proposed design. The Board is of the view that IPL has satisfactorily assessed the merits of each design alternative.

2.5 Adequacy of Downstream Capacity

In its application, IPL noted that Lakehead Pipe Line Partners, L.P. ("Lakehead") proposes to undertake a concurrent expansion program to complement IPL's Terrace Phase I expansion. Approximately 155 km (97 miles) of new 914 mm OD pipeline is planned to be in service by January 1999. Two additional tanks at Lakehead's Superior, Wisconsin tank farm would also be constructed with a planned in-service date of September 1999. IPL submitted that its Line 4 operations would not be affected by possible delays of the Lakehead expansion, but that Line 2 would not be available for service until the pipeline component of the Lakehead expansion is complete. A delay in the pipeline portion of the Lakehead construction could potentially cause a reduction in capacity of 25 000 m³/d (157,000 b/d) of heavy crude oil. IPL also confirmed that capacity downstream of Superior would be constrained by 36 000 m³/d (226,000 b/d) until Lakehead's Line 14 is placed in service. Line 14 is presently under construction and has a scheduled in-service date of December 1998.

Views of the Board

The Board is satisfied that IPL is taking reasonable steps to ensure that the required downstream facilities will be available as required.

Chapter 3

Environment and Land Matters

3.1 Route and Facility Site Selection

3.1.1 Pipeline Route Selection

Routing of the proposed pipeline was influenced by IPL's desire to minimize, where feasible, the number of lands newly affected and the amount of land disturbance. Consequently, consideration was generally not given to alternative routes and the existing pipeline right of way was chosen as the preferred route because:

- the existing route has been in service for approximately 40 years and is well known to all parties;
- adequate workspace is generally available along the route;
- no environmental or socio-economic constraints are encountered along the existing right of way that cannot be effectively mitigated or compensated;
- effects associated with a widening of an existing pipeline right of way would be incremental, while a new route would affect additional lands and increase the amount of land disturbance; and
- pipeline surveillance and maintenance activities can be conducted more efficiently for pipelines located within a common right of way than for two rights of way that are geographically separated.

Where new facilities could not be located on the existing right of way due to width constraints, IPL proposed that the facilities be located adjacent to it. As a result, all proposed pipe sections would be either within or adjacent to the existing IPL right of way, with the exception of two minor deviations. The first occurs at the South Saskatchewan River between kilometre post ("KP") 504.5 and KP 506.7. This deviation was necessary because of the locations of the pipelines in the existing right of way. The second deviation occurs between KP 907.8 and KP 929.1. That deviation was made as a result of the presence of highway and railway rights of way adjacent to IPL's existing right of way. This precluded IPL from simply expanding its existing right of way. The proposed new right of way would now abut the railway right of way.

3.1.2 Permanent Facility Site Selection

Siting of new facilities was also influenced by IPL's desire to limit the amount of new land disturbance, where practical, as well as to optimize maintenance activities and the use of existing infrastructure (e.g., access roads, power lines, fenced site boundaries, etc.) associated with IPL's facilities. Consequently, new permanent facilities, including pump units, scraper traps and valves, would be located within existing IPL lands.

Views of the Board

The Board agrees with IPL's rationale for locating the proposed facilities and associated temporary work space either within or adjacent to the existing IPL right of way. The general route proposed by IPL for the new pipeline, including the two deviations, is accepted by the Board. The Board notes that no new fee simple lands would be acquired to accommodate the additional facilities at existing pump stations.

3.2 Land Requirements and Acquisition

IPL has applied for a total of 619 km of line pipe between Kerrobert and the international border near IPL's Gretna station. Approximately 373 km of pipe would be constructed within IPL's existing right of way. The remaining 246 km would be constructed in new right of way to be acquired adjacent to IPL's existing right of way. However, two exceptions, as noted in Section 3.1.1, would be required.

IPL indicated that temporary work space would also be required for such activities as:

- river, highway and road crossings;
- "shoo-flies" and temporary access roads; and
- contractor yards and pipe storage and staging areas.

Views of the Board

The number of permanent easements and the amount of temporary work space required for pipeline construction is generally of concern to the Board because of the potential effects on landowners. In the present application, the Board finds that IPL's anticipated requirements for permanent easements and temporary work space are reasonable and justified.

3.3 Environmental Matters

The Board, pursuant to its regulatory process and the CEAA, completed an environmental screening of the proposed construction related to Terrace Phase I. The Board circulated the Environmental Screening Report to the applicant, those parties who requested a copy and federal agencies that had volunteered to provide specialist advice.

The comments received and the Board's views form Appendices I and II, respectively, to the Environmental Screening Report. Copies of the Environmental Screening Report are available upon request from the Board's Regulatory Support Office.

Views of the Board

The Board has considered the Environmental Screening Report and the comments received on the report and is of the view that, taking into account the implementation of the proposed mitigative measures and those set out in the attached conditions (Appendices IV and V), IPL's Terrace Phase I is not likely to cause significant adverse environmental effects. This represents a decision pursuant to paragraph 20(1)(a) of the CEAA and Part III of the Act.

Chapter 4

Supply, Markets and Economic Matters

4.1 Supply

IPL's crude oil production forecast for western Canada projected that supply would increase from 314 100 m³/d (1,980,000 b/d) in 1996 to a maximum of 410 200 m³/d (2,580,000 b/d) in 2009 and decrease in 2010 to 406 100 m³/d (2,550,000 b/d). The forecast was based on a composite of: a survey of western Canadian crude oil producers conducted in the fall of 1996, which was followed by extensive consultation with industry and governments; several updating adjustments to reflect light crude oil supply trends and the markets for heavy crude oil; and a number of more recent announcements regarding upgrading and synthetic oil projects. Respondents to the 1996 survey were asked to base their supply projections on a price per barrel for West Texas Intermediate ("WTI") at Cushing, Oklahoma that increased from a low of US\$17.50 in 1998 to US\$22.25 in 2010 and a price differential per barrel between WTI and Bow River crude oil at Chicago, Illinois that rose from US\$3.00 in 1996 to US\$7.00 by 2010.

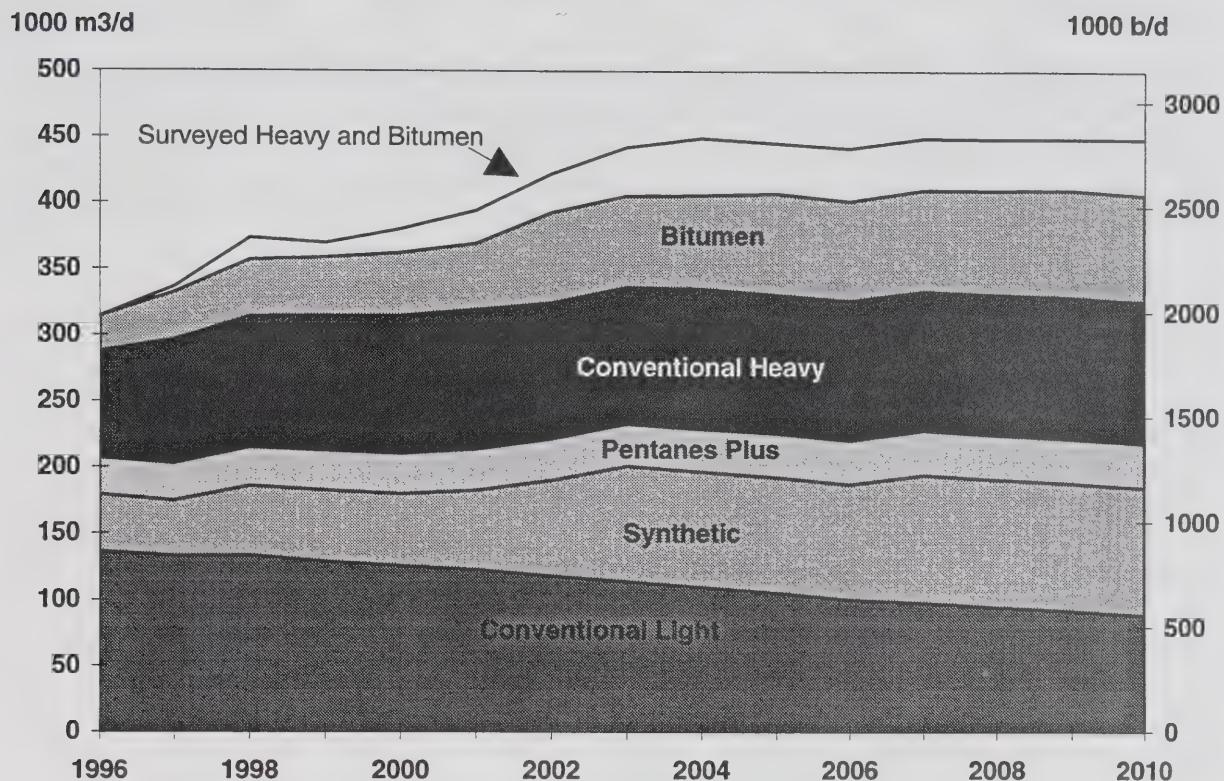
IPL projected that the supply of conventional light crude oil would decline from approximately 136 700 m³/d (859,800 b/d) in 1996 to 88 400 m³/d (556,000 b/d) by 2010. Over the same period, production of pentanes plus and synthetic crude oil from mining plants was forecast to nearly double from a total of 70 000 m³/d (440,300 b/d) to an estimated 133 100 m³/d (837,200 b/d). As a result, IPL forecast that total production of light crude oil and equivalent would increase slightly from 206 700 to 218 500 m³/d (1,300,000 to 1,370,000 b/d) over the forecast period.

IPL limited the projected growth in supply of heavy crude oil as a result of its assessment of the projected market demand for heavy crude oil. As a result, its forecast of heavy crude oil production was lower than was indicated in its survey of western Canadian crude oil producers. IPL estimated that heavy crude oil production, including both bitumen and conventional heavy crude oil, would rise from an average of 107 400 m³/d (675,500 b/d) in 1996 to a high of 188 600 m³/d (1,190,000 b/d) by 2009, and then decrease to 187 600 m³/d (1,180,000 b/d) in 2010. Without market constraints, IPL forecast that heavy crude oil production could potentially increase by an additional 42 400 m³/d (266,700 b/d) by the end of the forecast period.

Express Pipeline Ltd. ("Express") questioned IPL about the effect that current oil prices and differentials could have on IPL's production forecast. IPL agreed that the price assumptions used in its 1996 survey were probably higher than current prices would indicate were appropriate. In an undertaking, IPL subsequently provided a revised crude oil price forecast with projected prices lower for the years 1998 to 2001, but otherwise unchanged for the remainder of the forecast period.

Express also questioned whether IPL had updated its production forecast in response to recent industry announcements concerning the reduction in oil-directed drilling and the deferral of heavy oil projects. IPL acknowledged that it was aware that some companies had switched from oil-directed to gas-directed drilling and that several of the announced heavy oil projects were being deferred or delayed due to low crude oil prices. However, IPL noted that it had developed its initial supply forecast with significant industry input and that it had since reconfirmed overall supply expectations through

Figure 4-1
IPL Forecast of Western Canadian Crude Oil Production



informal surveys and extensive consultation with industry. IPL also noted that its production forecast for heavy crude oil was lower than the supply potential due to downstream market constraints which were reflected in the forecast. While there may be some variability in the overall supply potential because of pricing, IPL believed that the overall supply available from the Western Canada Sedimentary Basin would not change appreciably.

In a letter dated 15 April 1998, CAPP confirmed that IPL had used an industry consensus forecast. No other supply forecasts were submitted.

Views of the Board

The Board recognizes the uncertainties associated with forecasts of the supply of crude oil and equivalent and agrees with IPL that forecast heavy crude oil supply may be limited by market constraints. The Board notes that IPL's initial supply forecast was developed in consultation with industry and governments and that ongoing extensive consultation, including consideration of the effect of lower than expected commodity prices in the first quarter of 1998, has supported this forecast. The forecasts of the supply of crude oil and equivalent submitted by IPL are accepted as reasonable by the Board.

4.2 Markets

4.2.1 Demand

Western Canadian crude oil supplies markets in eastern and western Canada and export markets in PADDs¹ I, II, IV and V and offshore. IPL stated that in 1996 just over half of its volumes, including natural gas liquids and refined products, were delivered to export markets in PADDs I, II and IV, while another one-third was delivered to eastern Canada and the remainder to markets in western Canada.

IPL indicated that the PADD II market provides the best netbacks for western Canadian crude oil production. Crude oil from western Canada supplies approximately one-third of this market. In 1996, IPL delivered 125 100 m³/d (786,800 b/d) of the 133 500 m³/d (840,000 b/d) of western Canadian crude oil that flowed into PADD II. IPL submitted that the capacities of refineries served by IPL in PADD II total approximately 404 800 m³/d (2,500,000 b/d). IPL also stated that it has had confidential discussions with some of these refiners, who indicated that future crude oil requirements would exceed their current capacities.

Based upon the results of its 1996 survey, IPL anticipated that total PADD II demand for western Canadian crude oil would grow to 229 500 m³/d (1,444,000 b/d) by 2002, an increase of 96 000 m³/d (604,000 b/d) or 72 percent over 1996 levels. This increase includes refinery expansions to process heavy crude oil in PADD II totalling up to 26 900 m³/d (173,000 b/d). Even with this increase in heavy demand in PADD II, IPL noted that it had limited its estimate of the growth in Canadian heavy crude oil production to anticipated demand. In IPL's view, western Canadian crude oil supply would be sufficient to accommodate increased demand in PADD II, including volumes that would be redirected into PADD II as a result of the anticipated reversal of IPL's Line 9².

4.2.2 Western Canadian Crude Oil Available to IPL

IPL calculated production available to its system as the difference between western Canadian crude oil production and non-IPL disposition of western Canadian crude oil. Production volumes were adjusted for the blending of heavy crude oil with diluent, the addition of recycled and manufactured diluent and the upgrading of certain heavy blend volumes to synthetic light crude oil.

Using 1999 as a reference point, IPL expected that crude oil produced in western Canada would be distributed as follows:

- local western Canadian market (23%);
- Trans Mountain Pipe Line Company Ltd. (5%);

¹ PADD refers to the U.S. Petroleum Administration for Defense Districts. These are geographic aggregations of the 50 states and District of Columbia into five districts defined by the Petroleum Administration for Defense in 1950. These districts were originally defined during World War II for the purposes of administering oil allocation. Geographically, the five districts are East Coast (I), Midwest (II), Gulf Coast (III), Rocky Mountain (IV) and West Coast (V).

² Interprovincial Pipe Line Inc., OH-2-97, Reasons for Decision dated December 1997.

- Rangeland Pipe Line Company and Wascana Pipe Line Ltd.'s Milk River pipeline (6%);
- Express (6%); and
- IPL (60%).

Express challenged IPL's estimate of non-IPL disposition. In its letter of 2 December 1997, Express asserted that IPL had underestimated throughput on the Express system. Although it did not oppose IPL's proposed expansion, Express argued that IPL had underestimated growth in demand for western Canadian crude oil in markets served by Express. This growth was being created by a decline in indigenous PADD IV supply, refinery expansions and improved access to PADDs IV and II through pipelines connected to the Express pipeline. Moreover, Express was concerned that IPL had understated netbacks available in PADD II via the Express and Platte Pipeline Company ("Platte") systems, the effect of which was to make this route appear less attractive. However, Express presented no evidence to support its position.

In reply to Express, IPL agreed that if more volumes of western Canadian crude oil were delivered into PADD IV via other pipelines, then supply available to IPL would decrease. However, IPL stated that it had considered and rejected Express' input. IPL had prepared its forecast in consultation with industry, including shippers on Express. In IPL's view, it had not understated the volumes that would move to PADD IV.

The forecast of the crude oil production available to IPL is summarized in Table 4-1 below.

Table 4-1
Forecast of Western Canadian Crude Oil Production Available to IPL
 $(10^3 \text{ m}^3/\text{d})$

	1996	2000	2005	2010
Western Canada Production*	334.2	389.2	441.5	441.1
Non-IPL Demand				
Western Canada Exports				
- PADD IV**	21.1	38.8	34.9	31.3
- PADD V	17.5	7.7	7.8	5.0
Total Non- IPL Demand	127.0	149.4	154.3	150.1
Net Production Available to IPL	207.2	239.8	287.2	291.0
Other IPL Receipts	56.8	106.9	113.0	116.7
Total Supply Available to IPL	264.0	346.7	400.2	407.7

* Adjusted for blending of heavy crude oil, addition of recycled and manufactured diluent and upgrading of certain heavy blend volumes.
** Includes volumes transferred onto the Platte system for delivery into PADD II.

4.2.3 Throughput

IPL prepared forecasts of its system throughput for the years 1999 to 2010, both with and without the Terrace Phase I expansion. Without the expansion, IPL expected apportionment to continue for the entire period. However, with the expansion, it is expected that apportionment would not occur between September 1999 and late 2002. In the period 1999 to 2002, IPL forecast system throughput to be 332 900 to 360 500 m³/d (2,100,000 to 2,270,000 b/d), versus 329 000 to 322 700 m³/d (2,070,000 to 2,030,000 b/d) without the expansion. With the expansion, the system is expected to be at capacity after 2002 and the additional volumes would flow primarily to PADD II.

Views of the Board

The Board agrees with IPL that PADD II could absorb the forecast additional volumes of western Canadian crude oil and accepts IPL's evidence concerning available refinery capacity in the market and the ability of these refiners to process additional heavy crude oil.

Although Express challenged IPL's forecasts, it provided no evidence to support its view. The Board notes that IPL reduced its supply forecast for western Canadian crude oil to accord with its assessment of the markets available for that crude. If a larger market develops via the Express system, the Board is satisfied that additional supply would be available to satisfy that demand with IPL's proposed expansion in place.

The Board recognizes that the IPL system is currently under apportionment and that it may remain so even after the SEP II¹ facilities are in service. Further, the Board notes the extensive consultation undertaken by IPL and the broad support of industry for this expansion. On balance, the Board is satisfied that IPL has provided reasonable forecasts of markets, disposition and throughput.

4.3 Economic Feasibility

In its application, IPL measured the economic impact of the proposed expansion by calculating the projected increase in total producer revenue, or the projected increase in cash flow that would result due to additional volumes of crude oil reaching market via the IPL pipeline system.

For the years 2000 to 2010, the projected deliveries of crude oil through western Canadian pipeline systems were compared with the level of deliveries through those systems assuming that the Terrace Phase I facilities would be constructed. Transportation costs and resultant netbacks at Edmonton for each of the markets to which western Canadian crude oil is forecast to move from 2000 to 2010 were also considered. IPL's presentation of illustrative netbacks at Edmonton for 1997 from each of the markets that process western Canadian crude oil indicated that its system generally provides western Canadian crude oil producers with the highest netbacks, particularly with its connection to the PADD II market.

¹ In OH-1-96, the Board approved IPL's System Expansion Program Phase II to increase delivery capability of the existing IPL system in western Canada by 19 600 m³/d (120,000 b/d).

With the expansion facilities, IPL calculated that producer sector revenues over the 2000 to 2010 period are expected to increase by \$5.6 billion on a net present value basis versus the without expansion facilities case.

Express referred to IPL evidence and argued that heavy crude oil delivered via the Platte system to the southern PADD II market would provide a somewhat more attractive netback than an IPL delivery of heavy crude oil at Wood River. According to IPL, Chicago is expected to remain the most attractive netback market for western Canadian crude oil producers.

4.3.1 Support for Project

CAPP supported the project and an accelerated timetable for obtaining regulatory approval. At the start of the hearing, IPL filed a toll agreement negotiated with CAPP whereby IPL's shippers have guaranteed IPL the recovery of the costs of the expansion over a 15-year period from 1999 to 2013 (see Chapter 5 for further details).

Further letters of support were provided by the governments of Manitoba and Saskatchewan, which particularly welcomed the positive economic benefits for their provinces.

Views of the Board

The evidence indicates that industry and provincial governments are strongly supportive of the proposed expansion. In the Board's view, some of the benefits of this expansion would include the production of crude oil that would otherwise be shut in or sold to less attractive markets due to apportionment on IPL, as well as a potential improvement in the competitive position of western Canadian crude oil deliveries in PADD II as a result of increased reliability of these deliveries. The Board finds that the benefits of the IPL expansion are likely to be sufficient to justify the construction of the proposed facilities.

Chapter 5

Tolls and Financial Matters

In its application, IPL sought approval to have the capital and operating costs of Terrace Phase I treated as a Non-Routine Adjustment in accordance with paragraph 7.1(a)(i) of the Principles of Settlement filed in support of IPL's February 1995 Incentive Toll Application, approved by Board Order TO-1-95, and to have such costs recovered through tolls using an integrated toll design. IPL also indicated that it had been approached by CAPP to discuss the possibility of reaching a negotiated tolling agreement relating to the total Terrace Expansion Program facilities. On 15 April 1998, IPL filed with the Board a tolling agreement which had been ratified by CAPP members. A copy of the agreement is attached as Appendix II.

Upon filing the tolling agreement, IPL withdrew that portion of its application respecting the treatment of Terrace Phase I as a Non-Routine Adjustment.

A brief summary of the negotiated agreement is set out below.

- IPL and its affiliated company, Lakehead, would collect a fixed toll increment of a combined 5 cents (Canadian) per barrel that would recover costs for all phases of the Terrace Expansion Program.
- The 5 cent increment is based on the shipment of light crude oil from Edmonton to Chicago and tolls would continue to be distance based and subject to toll surcharges or credits for different commodity movements.
- The fixed toll increment would apply to all IPL/Lakehead base volumes and the Terrace incremental volume for a period commencing with the in-service date of Terrace Phase I and ending 31 December 2013.
- There would be a sharing of risks and benefits between IPL and its shippers.

IPL submitted that the toll arrangement would result in just and reasonable tolls and that its terms should be approved by the Board pursuant to Part IV of the Act and in conjunction with the Board's Guidelines for Negotiated Settlements.

On 15 April 1998, the Board issued a letter soliciting comments from parties to the hearing and shippers on the IPL system. No comments were received by the Board.

Views of the Board

The Board notes that the negotiated tolling agreement has broad shipper support. The Board considers the agreement to be a negotiated settlement within the meaning of its Guidelines for Negotiated Settlements. The Board is of the view that the settlement represented by the agreement will result in just and reasonable tolls. The terms of the agreement are therefore approved.

Chapter 6

Disposition

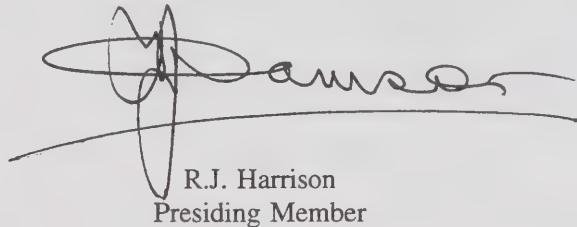
The foregoing constitutes our Reasons for Decision in respect of the applications heard by the Board in the OH-1-98 proceeding. The Board is satisfied from the evidence that the applied-for facilities are and will be required by the present and future public convenience and necessity.

The Board approves IPL's application made pursuant to section 52 of the Act for new line pipe facilities and will recommend to the Governor in Council that a certificate be issued, subject to the conditions set out in Appendix IV.

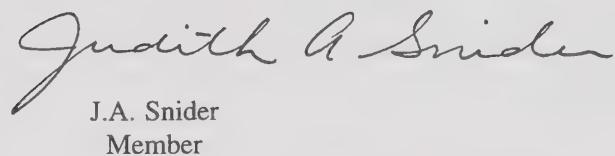
The Board approves IPL's application made pursuant to section 58 of the Act exempting all applied-for pump unit additions, replacements and modifications and related station facilities and piping from the provisions of sections 30, 31 and 47 of the Act. Accordingly, the Board has issued Order XO-J1-16-98, as shown in Appendix V.

The Board approves IPL's application made pursuant to section 21 of the Act varying Board Order XO-J1-10-98 to allow for the relocation of certain scraper trap facilities to new locations as described in the application. Accordingly, the Board has issued Amending Order AO-1-XO-J1-10-98, as shown in Appendix VI.

With respect to Part IV matters, the Board approves IPL's toll arrangement.



R.J. Harrison
Presiding Member



J.A. Snider
Member



D. Valiela

D. Valiela
Member

Calgary, Alberta
June 1998

Appendix I

List of Issues

1. The need for the expansion.
2. The economic feasibility of the proposed facilities.
3. The impact on market and supply.
4. The potential impact on existing shippers.
5. The appropriateness of the proposed method of financing the project.
6. The potentially adverse environmental and socio-economic effects of the proposed facilities, including those factors outlined in section 16(1) of the *Canadian Environmental Assessment Act*.
7. The safety of the design and operation of the proposed facilities.
8. The appropriate design and size of the applied-for facilities having regard to:
 - (a) the costs of the facilities in relation to the additional capacity to be provided; and
 - (b) the need for new capacity to transport oil and other liquid hydrocarbons.
9. The adequacy of connecting pipeline capacity to accommodate the project.
10. The appropriateness of the general route proposed.
11. The appropriate terms and conditions to be included in any approval which may be granted.
12. The determination of the appropriate toll treatment for the applied-for facilities.

Appendix II

Terrace Toll Agreement¹

Statement of Principles

1. Negotiated tolls for the IPL/LPL Terrace program will recover costs associated with all facilities associated with all phases of Terrace Expansion Program. The Terrace Expansion Program is expected to be a phased capacity addition program intended to add capacity in the years 1999 and following.
2. The Terrace facilities, the expected capacity increases associated with the facilities, and the in-service timing are appended as Schedule A. IPL and LPL commit to deliver the additional throughput capacity on or before the dates set out in these Principles. The dates upon which the facilities are expected to come into service are:
 - i) January 15, 1999 first in-service of Phase I facilities, providing 95,000 bpd of incremental capacity from a base system capacity (which includes SEP II and SEP III 350 Centistoke facilities) of 1,630,503 bpd (259,100 m³). The incremental capacity to be provided includes incremental heavy crude oil capacity on Line 3 (24 inch).
 - ii) September 30, 1999 second tranche of Phase I capacity in-service, totalling 167,000 bpd of incremental capacity from the base.
 - iii) Hardisty to Kerrobert extension in service September 30, 2000 [Phase II] providing 210,000 bpd of incremental capacity from the base
 - iv) Clearbrook to Superior extension and associated pumping in service September 30, 2001 [Phase III] providing 348,000 bpd of incremental capacity from the base
 - v) Mokena to Griffith extension, Line 14 stations in service, Line 14 heater in service between 2002 and 2007 [later Terrace phase(s)]
3. The in service commitments made by IPL/LPL are subject to CAPP providing written notice to IPL/LPL requesting construction in advance of the proposed in-service dates. The notice periods in respect of Phase II, III and later Terrace Phases described above are 18 months, 24 months and 36 months respectively; provided that notice given prior to March 31, 1999 in respect of Phase II may be deemed by IPL/LPL to have been given on March 31, 1999. Upon IPL giving notice to CAPP of a requirement by IPL/LPL to undertake material commitments in order to meet in-service dates, CAPP will confirm its continuing service request prior to IPL/LPL being required to make those commitments.
4. For the purpose of determining "in service" the date which shall be used for IPL is the date upon which the last leave to open order is granted by the National Energy Board for the completion of pipeline facilities in Phase I (excluding pump stations) and for LPL, the availability of the facilities for service.

¹ Please note that the text of the agreement as shown in Appendix II of these Reasons is not an official version of the agreement.

5. The delivery by IPL/LPL of the capacities associated with Phase I is subject to shipper approval for commingling crude in Line 3 (24 inch) to be transported in laminar flow.
6. Cost recovery on the Terrace investment and related operating costs will be effected by application of a fixed toll increment applicable to all base (259,100 m3) and Terrace volume transported on the IPL/LPL systems.
7. The toll increment shall be five cents (Cdn) per barrel for light crude transportation from Edmonton to Chicago, and shall be adjusted on a distance basis and for commodity credits or surcharges, consistent with IPL and LPL's then existing toll design.
8. The fixed toll increment charge will become effective upon the in-service of the first of the Terrace facilities, as "in service" is defined in paragraph 4, and shall terminate December 31, 2013.
9. The fixed toll increment shall be allocated between IPL and LPL as determined by IPL and LPL, provided that no less than one cent shall ever be allocated to either of the IPL or LPL system.
10. The fixed toll increment shall be subject to a transportation revenue variance (TRV) in IPL which operates in the same fashion as the then-existing TRV in IPL. In the event there is no TRV mechanism in place for IPL, the fixed toll increment shall be subject to a TRV which operates in the same fashion as the TRV operated in IPL in 1997.
11. The base toll upon which the fixed increment will be added assumes the filling of the IPL/LPL systems at the quoted SEP II capacity of 1,630,503 bpd (259,100 m3/day).
12. IPL and LPL will assume one hundred percent of operating cost variance risk, excluding changes to property tax expense which exceeds the forecast by twenty percent or more. Property tax variances exceeding twenty percent from forecast shall result in an increase to the fixed toll increment in accordance with Schedule B.
13. IPL and LPL will assume five percent of the capital cost variance risk and fifty percent of the capital cost variance risk thereafter on quoted target costs set out below. Target costs for the purpose of capital cost variance for facilities to be constructed after 1999 will be inflated from December 31, 1997 using the Canadian and US GDP deflators for facilities in IPL and LPL respectively.

IPL Cdn \$	LPL US\$	
\$575 mm	\$117 mm	Jan. 1999 Phase I
\$35 mm	\$17 mm	Sept. 1999 Phase I
\$227 mm	\$178 mm	Phases II & III 2000 and 2001
	\$70 mm	Other Phases 2002-2007

14. In the event CAPP does not provide notice to IPL on or before July 1, 2001 requesting IPL/LPL to proceed with both Phases II and III, costs for the project, including revenue variance between the application of the fixed toll increment and the cost of service model, will be calculated, and prospective tolls will be collected on a cost of service basis. Capital and operating cost sharing risk will revert to the traditional cost of service recovery.
15. Until such time as both Phases II and III are placed into service, Phase I will be considered to be a Non Routine Adjustment (NRA) in both IPL and LPL as NRA is defined and treated in the 1995 IPL Incentive Toll Settlement. However, tolls will continue to be charged at the five cent negotiated rate subject to the TRV in IPL. Any revenue variance will be amortized and collected over the remaining term of the Principles (effective January 1, 2002) if Phases II and III are not committed to by July 1, 2001.
16. If quoted forecast capacities are not achieved and sustained in the long term, for so long as a capacity shortfall exists, a refund of one cent per bbl for each 35,000 bbl capacity shortfall shall be effected through a reduction to the subsequent year's tolls. IPL/LPL shall not be obligated to provide a refund in respect of any capacity shortfall for which no volume is available to be nominated to and shipped on the IPL/LPL systems.
17. The fixed toll increment of five cents shall be adjusted upward or downward as the case may be in accordance with Schedule B for the following:
 - i) Agreed upon scope changes to the project;
 - ii) Agreed upon timing changes to the project;
 - iii) Capital cost variance;
 - iv) Construction cost variance due to agreed upon circumstances which are extraordinary and not within the control of IPL/LPL;
 - v) Property tax variances in excess of twenty percent from forecast;
 - vi) In respect of Phases other than Phase I, bond rate variation by more than two percentage points from 1998 levels; and
 - vii) Multi-pipeline return on equity variation by more than two percentage points from 1998 level.
18. Subsequent to LPL completing Phase III, in the event annual actual average pumpings ex-Clearbrook are less than 215,000m³, 220,000m³ and 225,000m³ from in-service to year-end 2002, 2003, and 2004 through 2013 inclusive, respectively, an adjustment to the fixed toll increment shall be made in accordance with Schedule C.
19. Energy costs attributable to Terrace will be calculated using a base power cost for an agreed upon delivery forecast assuming pre-Terrace at a capacity of 259,100 m³/day. The calculation of the power allowance for the purpose of calculating the TRV will be based on the difference in the total forecast fuel and power requirements and the actual fuel and power, using the

average annual cost of fuel and power for the TRV year. IPL and CAPP are completing a schedule which will set out in detail the elements of the energy calculation.

20. The implementation of the toll method contemplated in these Principles is subject to IPL and LPL Board approval and National Energy Board and Federal Energy Regulatory Energy Commission approval of the settlement for IPL and LPL respectively.
21. The implementation of the toll method contemplated in these Principles is subject to IPL and LPL Board approval.

Schedule A
Description of Terrace Facilities

Phase 1 Facilities

Proposed Facilities	Items Considered to be Scope Changes to Terrace	Not in Terrace Scope
<p>Pipe</p> <ul style="list-style-type: none"> • 619 km of 914 mm line pipe between Kerrobert and Gretna stations in Canada in 15 sections in Canada along with associated valving, tie-in piping and scraper facilities • 100 miles of 36 inch line pipe in 4 sections between Gretna and Clearbrook stations in the USA along with associated valving and tie-in piping 	<ul style="list-style-type: none"> • Changes totalling more than 5 miles of pipe between Canada and the USA • Changes in pipe diameter 	

Pump Stations	<p>Additional pumping power or DRA to achieve capacities greater than the quoted annual capacities in the NEB application in Terrace Phase 1 i.e.</p> <ul style="list-style-type: none"> • Line 1, 49,500 m3/day • Line 2A, 66,000 m3/day • Line 2B, 81,200 m3/day • Line 3 24" heavy line, 25,000 m3/day • Line 4 36"/48" heavy line, 102,100 m3/day <p>Changes in deliveries that negatively impact Lakehead's ability to inject crude into Lines 2 and 4 at Clearbrook in Phase I</p>	<p>Capacity increases on Lines not affected by Terrace including in Western Canada:</p> <ul style="list-style-type: none"> • Line 13 27,800 m3/day • Changes resulting from the SEP II facilities as filed with the NEB and as agreed to with industry which impact quoted Line capacities • Changes in facilities required to accommodate crude characteristics other than referenced in Table 3.10.1 in the NEB application
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Breakout and Terminalling Facilities <ul style="list-style-type: none"> • 2 breakout tanks at Superior 	<ul style="list-style-type: none"> • Additional breakout tankage 	<ul style="list-style-type: none"> • Additional tankage, receipt, delivery, terminalling or connecting facilities at any location in Canada or USA • Requested commodity segregation which results in additional tankage, metering, or terminalling facilities • Changes in facilities required to accommodate crude characteristics other than referenced in Appendix 3.10 in the NEB application
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Phase 2 Facilities

Proposed Facilities	Items Considered to be Scope Changes to Terrace	Not in Terrace Scope
Pipe 123 km of 914 mm line pipe in 3 sections between Hardisty and Kerrobert pump stations with associated valving and tie-in facilities	Changes totalling more than 5 miles of pipe Changes in pipe diameter	
Pump Stations Sufficient pumping equipment and power to provide 6,900 m ³ /d of incremental capacity beyond Phase I facilities, assuming that Line 3 operates in laminar flow and that Hardisty crudes are pumped in Line 3 in sufficient quantities to operate at 27,000 m ³ /d at its bottleneck point.	Additional pumping power or DRA to achieve capacities greater than the quoted annual capacities in the NEB application in Terrace Phase 1 i.e. <ul style="list-style-type: none"> • Line 1 49,500 m³/day • Line 2A 66,000 m³/day • Line 2B 81,200 m³/day • Line 3 24" heavy line 27,000 m³/day • Line 4 36"/48" heavy line 107,000 m³/day 	<ul style="list-style-type: none"> • Additional pumping power or DRA to achieve capacities greater than that quoted in Phase 1 facilities: • Changes in facilities required to accommodate crude characteristics other than referenced in Appendix 3.10 in the NEB application • Changes in facilities required to accommodate crude characteristics other than referenced in Table 3.10.1 in the NEB application
Breakout and Terminalling Facilities	<ul style="list-style-type: none"> • breakout tankage 	<ul style="list-style-type: none"> • additional tankage, receipt, delivery, terminalling or connecting facilities at any location in Canada or USA • Requested commodity segregation which results in additional tankage, metering, or terminalling facilities

Phase 3 Facilities

Proposed Facilities	Items Considered to be Scope Changes to Terrace	Not in Terrace Scope												
Pipe 120 miles of 36 inch line pipe in 5 sections between Clearbrook and Superior pump stations with associated valving and tie-in facilities	Changes totalling more than 5 miles of pipe Changes in pipe diameter													
Pump Stations Sufficient power to provide 23,500 m ³ /d of incremental capacity above Terrace Phase II facilities.	Facility changes on Line 14 that exceed \$US 70 MM and are other than the following items: <ul style="list-style-type: none">• Pump unit and station additions• Pump unit replacements or modifications• Crude oil heaters• Pipeline connections or extensions to Griffith.	Additional pumping power or DRA to achieve capacities greater than: <table><tbody><tr><td>• Line 1</td><td>41,400 m³/day</td></tr><tr><td>• Line 2A</td><td>54,000 m³/day</td></tr><tr><td>• Line 2B</td><td>65,000 m³/day</td></tr><tr><td>• Line 3 heavy line</td><td>74,000 m³/day</td></tr><tr><td>• Line 4 heavy line</td><td>107,800 m³/day</td></tr><tr><td>• Line 13</td><td>27,800 m³/day</td></tr></tbody></table> Changes in facilities required to accommodate crude characteristics other than referenced in Appendix 3.10 in the NEB application	• Line 1	41,400 m ³ /day	• Line 2A	54,000 m ³ /day	• Line 2B	65,000 m ³ /day	• Line 3 heavy line	74,000 m ³ /day	• Line 4 heavy line	107,800 m ³ /day	• Line 13	27,800 m ³ /day
• Line 1	41,400 m ³ /day													
• Line 2A	54,000 m ³ /day													
• Line 2B	65,000 m ³ /day													
• Line 3 heavy line	74,000 m ³ /day													
• Line 4 heavy line	107,800 m ³ /day													
• Line 13	27,800 m ³ /day													
Breakout and Terminalling Facilities <ul style="list-style-type: none">• 2 breakout tanks at Superior	<ul style="list-style-type: none">• additional breakout tankage	<ul style="list-style-type: none">• additional tankage, receipt, delivery, terminalling or connecting facilities at any location in Canada or USA• Requested commodity segregation which results in additional tankage, metering, or terminalling facilities												

Future Phases of Terrace Facilities

Proposed Facilities	Items Considered to be Scope Changes to Terrace	Not in Terrace Scope
Pipe \$US 27 million in pipeline facilities between Mokena and Griffith by the end of 2002 if needed		<ul style="list-style-type: none"> Any additional pipeline extensions or connections
Pump Stations \$US 40 million in station additions and modifications on Line 14 by the end of 2003 if needed		<ul style="list-style-type: none"> Any incremental pump unit additions after the intermediate stations are installed
Crude Oil Heater \$US 3 MM in heating facilities to increase Line 14 capacity by the end of 2007 if needed		<ul style="list-style-type: none"> Any other heating facilities

Schedule B

Adjustments to the 5 cents per barrel Increment (Cdn Dollars)

	Adjusting Event	Adjustment	
		Phase I	Phase II
1	Scope Changes resulting in Capital cost changes greater than +/- \$10 million from original estimate provided in Schedule A	0.18 cents per barrel per \$10 million change in capital costs	0.14 cents per barrel per \$10 million change in capital costs
2	Capital Cost Variance outside +/- 5 % of estimate provided in Schedule A	0.09 cents per barrel per \$10 million change in capital costs	0.07 cents per barrel per \$10 million change in capital costs
3	Increases in Multi-pipeline cost of equity beyond current rate plus 200 basis points	For 1999-2007 and for 2008-2013 .3 cents per barrel and .15 cents per barrel respectively for each 25 basis point change in the multi-pipeline rate of return which exceeds the 1998 multi-pipeline rate of return plus or minus 200 basis points.	
4	Increases in Cost of Debt over 200 basis points above current Long Canada (5.28%) and US (5.65%) 10 year bonds	For Phases II and following, .1 cent per barrel change for every 50 basis point change in debt cost above the 200 basis point increase. The toll change for debt cost increases shall apply to IPL and LPL independently.	
5	Property Tax Increases on Terrace Facilities greater than +/-20 on estimate	.2 cents per barrel for each \$ 1 million change in property tax greater than 20%	
6	Capacity Penalty	1 cent decrease per barrel per 35,000 barrels per day below stated capacity until capacity is provided	1 cent decrease per barrel per 35,000 barrels per day below stated capacity until capacity is provided

*the values in items 3, 4 and 5 are subject to finalization

Schedule C

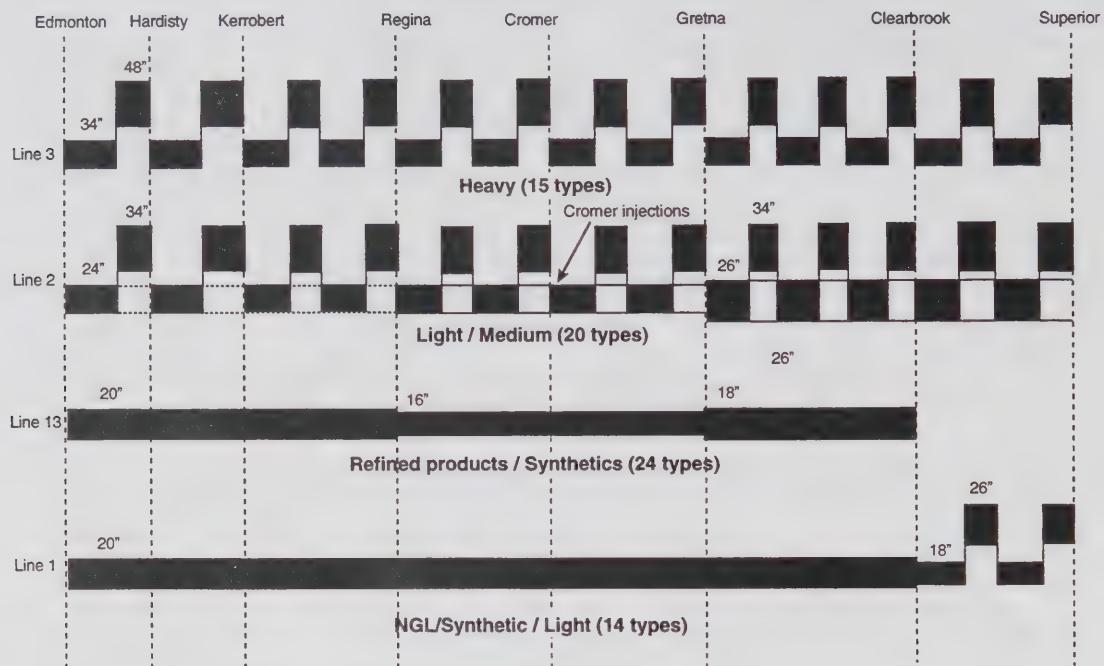
Adjustment for LPL Phase III trigger
Increment Increase in Year following pumpings below specified target
(Cdn Currency)

Prior Year's Actual Average Pumpings Ex- Clearbrook	Toll Adjustment for Year		
	2002	2003	2004-2013
Greater than 225,000 m3/day	0 cents/barrel	0 cents/barrel	0 cents/barrel
220 000 m3/day to 224 999 m3/day	0 cents/barrel	0 cents/barrel	1 cents/barrel
215 000 m3/day to 219 999 m3/day	0 cents/barrel	1 cents/barrel	2 cents/barrel
210 000 m3/day to 214 999 m3/day	1 cents/barrel	2 cents/barrel	3 cents/barrel
205 000 m3/day to 209 000 m3/day	2 cents/barrel	3 cents/barrel	4 cents/barrel
200 000 m3/day to 204,999 m3/day	3 cents/barrel	4 cents/barrel	5 cents/barrel

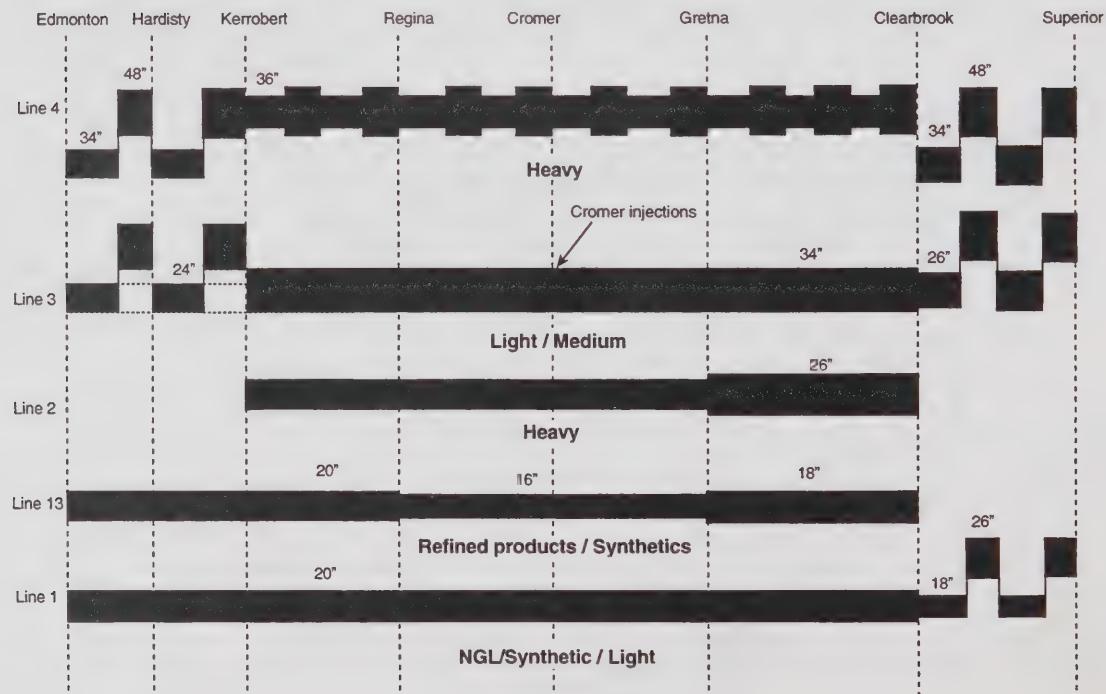
Appendix III

IPL's System Operation

Post Sep II



Post Terrace Phase I Expansion



Appendix IV

Certificate Conditions

General

1. Unless the Board otherwise directs, IPL shall implement or cause to be implemented all of the policies, practices, recommendations and procedures for the protection of the environment included in or referred to in its application, in its undertakings made to other regulatory agencies or as otherwise adduced in evidence through the application process.
2. Unless the Board otherwise directs, IPL shall cause the approved facilities to be designed, manufactured, located, constructed and installed in accordance with those specifications, drawings and other information or data set forth in its application or as otherwise adduced in evidence before the Board.

Prior to the Commencement of Construction

3. Unless the Board otherwise directs, the company shall file, at least 14 days prior to the commencement of construction, a detailed construction schedule or schedules identifying major construction activities and shall notify the Board of any substantive modifications to the schedule or schedules as they occur.
4. Unless the Board otherwise directs, the company shall, at least 14 days prior to the commencement of construction, file with the Board for approval the company's field joining program.
5. Unless the Board otherwise directs, IPL shall file with the Board a report on the feasibility of directionally drilling the South Saskatchewan, Qu'Appelle and Souris Rivers and obtain approval of the Board for the crossing methodology at each of these rivers at least 14 days prior to construction at each location.
6. Unless the Board otherwise directs, IPL shall, at least 14 days prior to the commencement of construction of the pipeline crossings of Eagle Creek (KP 393.8 and KP 425.9), South Saskatchewan River (KP 505.2), Qu'Appelle River (KP 657.0), High Hill Creek (KP 667.0), Cottonwood Creek (KP 679.5), Wascana Creek (KP 689.5), Chapleau Lakes (KP 783.3), Little Pipestone Creek (KP 907.0), Black Creek (KP 1065.8), Souris River (KP 1073.5), Spring Brook (KP 1078.4 and KP 1079.0), Oak Creek (KP 1109.3 and KP 1110.3), Cypress River (KP 1120.1 and KP 1131.6), Mary Jane Creek (KP 1164.0), Thornhill Coulee (KP 1186.3) and Deadhorse Creek (KP 1196.8):
 - (a) file the fish and fish habitat assessment and any new mitigative measures IPL would implement resulting from the assessment;
 - (b) file the assessment of the environmental impact on fish habitat and resources at the crossing site and downstream referred to in (a) shall include, without limitation, the following:

- (i) the distribution of salmonids;
- (ii) the presence of salmonids in a tributary;
- (iii) the presence of a spawning ground within 100 m of a watercourse crossing;
- (iv) the presence of a spawning ground for warm water species within 100 m of a watercourse crossing;
- (v) the presence of an endangered or threatened species;
- (vi) the presence of a spawning migration;
- (vii) a sensitive spawning and nursery habitat downstream; and
- (viii) the risk of sediment transport;

(c) in respect to those watercourse crossings which have been found to be sensitive, as a result of the assessment in (b) above:

- (i) the exact location and area of spawning grounds found within 100 m of the watercourse crossing;
- (ii) the percentage of the spawning grounds that would be affected by construction;
- (iii) the species spawning at these sites;
- (iv) the exact dates of construction;
- (v) a detailed description of the construction method to be used;
- (vi) sedimentation control plans;
- (vii) estimates of the habitat loss and/or diminished productivity; and
- (viii) development of a follow-up program on the productivity of the spawning grounds after construction;
- (ix) site-specific mitigative and restorative measures to be employed as a result of undertakings to regulatory agencies;
- (x) evidence to demonstrate that all issues raised by regulatory agencies have been satisfactorily resolved, as well as updated environmental assessments for those areas where deficiencies were noted; and
- (xi) status of authorizations, including the wording of the environmental conditions;

(d) provide copies to the Board of all correspondence from Saskatchewan Environment and Resource Management, Manitoba Natural Resources and the Department of Fisheries and Oceans - Habitat Management Division ("DFO-HMD") regarding the acceptability of the fishery resource assessment referred to in paragraph (a); and

(e) provide a description of the watercourses where DFO-HMD has required authorization pursuant to the *Fisheries Act* and confirmation that those authorizations have been obtained.

7. IPL shall, prior to the commencement of construction within the wetted perimeter of any watercourse deemed to be navigable pursuant to the *Navigable Waters Protection Act*, provide:

(a) confirmation that the appropriate permits have been obtained from the Canadian Coast Guard's Regional Offices; and

(b) a description of any additional procedures or measures that the Canadian Coast Guard has required IPL to implement at the watercourse crossings.

8. Unless the Board otherwise directs, IPL shall, at least 5 days prior to commencement of construction, file with the Board:

- (a) copies of the preconstruction archaeology surveys conducted at the 15 pipeline loop sections between IPL's pump station at Kerrobert, Saskatchewan and the international border near its pump station at Gretna, Manitoba; and
- (b) copies of all correspondence from the provincial archaeological authorities regarding the acceptability of the archaeological surveys referred to in paragraph (a).

During Construction

9. Unless the Board otherwise directs, should there be a requirement to remove excess bedrock by blasting at any work site, IPL shall:

- (a) prior to the commencement of construction conduct a survey of the location of all water wells within 100 m of the proposed blasting location and sample the well water for quality, quantity and any additional parameters requested by the provincial regulatory body;
- (b) during blasting and rock removal operations, monitor the quality and quantity of the water in the water wells surveyed pursuant to paragraph (a);
- (c) if water quality or quantity is affected by blasting operations, provide each resident utilizing the affected well with a clear, potable water source in comparable quantity to the original source until the water in the affected well returns to its original conditions; and
- (d) after construction, conduct a survey of the water wells surveyed pursuant to paragraph (a) to ensure that there has been no change to the quality and quantity of the water in the wells and report the results of those surveys to the Board.

Post Construction

10. IPL shall, prior to the commencement of hydrostatic testing of the Terrace Phase I Expansion Program facilities, provide confirmation that all necessary or required regulatory approvals have been obtained and local municipalities have been consulted.

11. IPL shall, prior to the Terrace Phase I facilities being placed in service, file with the Board updated copies of:

- (a) the company's operations and maintenance manual; and
- (b) the company's emergency procedures.

12. IPL shall file with the Board, prior to the Terrace Phase I facilities being placed in service, a report on the re-evaluation of its existing Line 2 internal corrosion control program, specifically addressing potential corrosion issues associated with laminar flow.
13. IPL shall, pursuant to section 58 of the *Onshore Pipeline Regulations* ("OPR"), file with the Board a post-construction environmental report within six months of the date that the 619 km (385 miles) of 914 mm (36 inch) outside diameter pipe segments connecting the existing 1219 mm (48 inch) outside diameter pipeline segments are placed in service. The post-construction environmental report shall set out the environmental issues that have arisen up to the date on which the report is filed and shall:
 - (a) indicate the issues resolved and those unresolved; and
 - (b) describe the measures IPL proposes to take in respect of the unresolved issues.
14. IPL shall, pursuant to section 58 of the OPR, file with the Board, on or before the 31 December following each of the first two complete growing seasons after the post-construction environment report referred to in condition 13 has been filed, a report containing:
 - (a) a list of the environmental issues indicated as unresolved in the previous post-construction report and any that have arisen since that report was filed; and
 - (b) a description of the measures IPL proposes to take in respect of any unresolved environmental issues.
15. Unless the Board otherwise directs prior to 31 December 1999, this certificate shall expire on 31 December 1999 unless construction and installation with respect to the applied-for facilities has commenced by that date.

Appendix V

Order XO-J1-16-98

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the regulations made thereunder; and

IN THE MATTER OF an application, pursuant to section 58 of the Act, by Interprovincial Pipe Line Inc. ("IPL") filed with the Board under File No. 3200-J001-5.

BEFORE the Board on 2 June 1998.

WHEREAS the Board has received IPL's Terrace Phase I Expansion Program application, dated 2 December 1997 and as amended on 31 March 1998, at an estimated total cost of \$610 million;

AND WHEREAS in its Terrace Phase I Expansion Program application, IPL applied pursuant to section 58 of the Act for the approval of all applied-for pump unit additions, replacements and modifications and related facilities and station piping as listed in Schedule A ("the station facilities");

AND WHEREAS pursuant to the *Canadian Environmental Assessment Act* ("CEAA"), the Board has performed an environmental screening of the station facilities and has considered the information submitted by IPL;

AND WHEREAS the Board has determined, pursuant to paragraph 20(1)(a) of the CEAA that, taking into account the implementation of IPL's proposed mitigative measures and those set out in the attached conditions, the station facilities are not likely to cause significant adverse environmental effects;

AND WHEREAS the Board has examined the application and considers it to be in the public interest to grant the relief requested;

IT IS ORDERED that, pursuant to section 58 of the Act, the station facilities are exempt from the provisions of sections 30, 31 and 47 of the Act, upon the following conditions:

1. Unless the Board otherwise directs, IPL shall implement or cause to be implemented all of the policies, practices, recommendations and procedures for the protection of the environment included in or referred to in its application, in its undertakings made to other regulatory agencies or as otherwise adduced in evidence through the application process.
2. Unless the Board otherwise directs, IPL shall cause the approved facilities to be designed, manufactured, located, constructed and installed in accordance with those specifications, drawings and other information or data set forth in its application or as otherwise adduced in evidence before the Board.

3. Unless the Board otherwise directs, the company shall file, at least 14 days prior to the commencement of construction, a detailed construction schedule or schedules identifying major construction activities and shall notify the Board of any substantive modifications to the schedule or schedules as they occur.
4. Unless the Board otherwise directs, the company shall, at least 14 days prior to the commencement of construction, file with the Board for approval the company's field joining program.
5. IPL shall, prior to the commencement of hydrostatic testing of the station facilities, provide confirmation that all necessary or required regulatory approvals have been obtained and local municipalities have been consulted.
6. IPL shall, prior to the operation of the station facilities, file with the Board updated copies of:
 - (a) the company's operations and maintenance manual; and
 - (b) the company's emergency procedures.
7. IPL shall, during the first quarter of operation after start-up, conduct and file with the Board noise emission surveys to confirm that the actual noise emission levels resulting from the installation of new electrically driven pump units within or adjacent to seven existing IPL pump stations do not exceed the anticipated noise emission levels at the pump station fence line and at the nearest residence.
8. Unless the Board otherwise directs prior to 31 December 1999, this Order shall expire on 31 December 1999 unless construction and installation with respect to the applied-for facilities has commenced by that date.

NATIONAL ENERGY BOARD

Michel L. Mantha
Secretary

Schedule A
IPL TERRACE PHASE 1 EXPANSION PROGRAM APPLICATION
Station Facilities
As Applied for Pursuant to Section 58 of the Act

	Kerrobert	Herschel	Milden	Loreburn	Craik	Bethune	Regina	Odessa	Glenavon	Langbank	Cromer	Souris	Glenboro	St. Leon	Greina	Total
New Pump Station (3 unit)												X		X	X	3
Line 3 Pump Station unit & piping modifications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Pump & motor replacements (3.2 & 3.3)	X		X		X											4
Replace pump 3.1 with existing pump	X	X		X		X										4
Delivery & injection piping modification	X					X										2
Line 2 Pump Station piping	X		X			X		X								6
Delivery & injection piping modification	X					X		X				X				3
Line 2 Pump Station - relocate one pump & motor	X									X		X		X		5
Pump & motor addition	X									X						2
Delivery & injection piping modification	X									X						2

Notes:

19 new pump units as per IPL's application

All other pumps replaced by relocating existing units

Appendix VI

Order AO-1-XO-J1-10-98

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the regulations made thereunder; and

IN THE MATTER OF an application by Interprovincial Pipe Line Inc. ("IPL") filed with the Board under File No. 3200-J001-5.

BEFORE the Board on 2 June 1998.

WHEREAS the Board has previously issued Order XO-J1-10-98 approving the installation of three sending and three receiving scraper traps for use on the 904 mm (48 inch) outside diameter pipe sections upstream of IPL's Herschel, Glenavon and Glenboro stations;

AND WHEREAS the Board has received IPL's Terrace Phase I Expansion Program application, dated 2 December 1997 and as amended on 31 March 1998, in which IPL requested an amendment to Order XO-J1-10-98, allowing the previously approved three sending scraper traps to be relocated and placed in service at IPL's Loreburn, Craik and Odessa stations ("the project");

AND WHEREAS pursuant to the *Canadian Environmental Assessment Act* ("CEAA"), the Board has considered the information submitted by IPL and has performed an environmental screening of the proposed project;

AND WHEREAS the Board has determined, pursuant to paragraph 20(1)(a) of the CEAA that, taking into account the implementation of IPL's proposed mitigative measures, the proposed project is not likely to cause significant adverse environmental effects;

IT IS ORDERED that, pursuant to section 21 of the Act, Order XO-J1-10-98 be amended and that the project be exempted from sections 30, 31 and 47 of the Act, upon the following condition:

Unless the Board otherwise directs prior to 31 December 1999, this Order shall expire on 31 December 1999, unless construction and installation of the proposed project has commenced by that date.

NATIONAL ENERGY BOARD

Michel L. Mantha
Secretary

